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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/700,328	11/03/2003	Ling Chen	005190 CPI/COPPER	5144
44257 7590 03/18/2008 PATTERSON & SHERIDAN, LLP - - APPM/TX 3040 POST OAK BOULEVARD, SUITE 1500 HOUSTON, TX 77056				
EXAMINER				
CHEN, KEATH T				
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1792				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/700,328

Applicant(s)

CHEN ET AL.

Examiner

KEATH T. CHEN

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 December 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-946)
- 3) ☐ Information Disclosure Statement(s) (PTO/SG/US)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Terminal Disclaimer

1. The terminal disclaimer filed on December 27, 2007 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of US Pat. 6,772,072 has been reviewed and is accepted. The terminal disclaimer has been recorded.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35 U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1, 3-11, 13-23, and 25-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iseki et al. (US 6174371, hereafter '371), further in view of Gomi (US 5288325 A, hereafter '325).

'371 teaches the limitations of:

Claim 1: An apparatus (Fig. 2) for controlling delivery of a precursor from a vessel (#10, vaporizer) to a process chamber (#50), comprising: a first carrier gas (the lower N₂) flowing into the vessel, whereby the first carrier gas is combined with the precursor (treating liquid, col. 7, lines 45-46); an output (#14) from the vessel in fluid communication with the process chamber; a second valve (#41; Figure 1; column 8, line 34) adapted to regulate a second carrier gas (the upper N₂) flowing to the process chamber (through mixer #38) whereby the first and second carrier gases and the precursor are combined to form a process gas, and a controller (#72).

Claim 11: A system comprising: a process chamber (#50); a gas delivery system (#30) adapted to deliver a precursor from a vessel (#10) containing the precursor to the process chamber via a process gas produced by flowing a first carrier gas (the lower N₂) into the vessel

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and combining the first carrier gas with a second carrier gas (the upper N₂) flowing through a bypass around the vessel (as shown in Fig. 2, the upper N₂ does not flow through #10); and an integral controller (#72; col. 10, lines 11-15).

Claim 23: An apparatus for delivering of a precursor from a vessel (#10) to a process chamber (#50), comprising: a first carrier gas (the lower N₂) flowing through an input (#13) into the vessel; an output (#14) from the vessel in fluid communication with the process chamber; a second valve (#41; Figure 1; column 8, line 34) to regulate a second carrier gas (the upper N₂) flowing to the process chamber; a process gas comprising the first carrier gas, the second carrier gas and the precursor; and a controller (#72).

Claim 13: A second valve (#41; Figure 1; column 8, line 34) controls the second carrier gas.

Claims 3 and 5: The controller is configured to adjust the second valve (#41, label at bottom of Fig. 2; column 8, line 34).

Claims 14 and 16: The integral controller is configured to adjust the second valve (#41; label at the bottom of Fig. 2; column 8, line 34).

Claim 4: The controller is configured to adjust a temperature of the vessel to change the concentration of the precursor in the process gas (heater #12 connected to main controller #72, col. 8, line 65 to col. 9, line 5). When the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).

Claim 15: The integral controller is configured to increase a temperature of the vessel to increase the concentration of the precursor in the process gas. When the structure recited in the

reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).

Claim 25: The controller is configured to increase a temperature of the vessel to increase the concentration of the precursor in the process gas. When the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).

Claim 7: The second valve (41; Figure 1; column 8, line 34) is adjustable to maintain a constant flow of the process gas (the valve is adjustable, and the apparatus is capable of being adjusted to maintain a constant flow rate of the process gas. Applicant's claim requirement of "adjustable to maintain a constant flow of the process gas" is a claim requirement of intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).

Claim 27: The second valve (#41; Figure 1; column 8, line 34) adjusts to maintain the process gas constant (the apparatus is capable of adjusting to maintain a constant flow rate of the process gas). Applicant's claim requirement of "to maintain the process gas constant" is a claim requirement of intended use in the pending apparatus claims. Further, it has been held that claim

language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106).

Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

Claim 18: The second valve (41; Figure 1; column 8, line 34) is adjusted to maintain a constant flow of the process gas (the apparatus is capable of adjusting to maintain a constant flow rate of the process gas, moreover, this is intended use). Applicant's claim requirement of "is adjusted to maintain a constant flow of the process gas" is a claim requirement of intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

Claims 8, 19, and 28: "The first carrier gas and the second carrier gas are the same" (N2, moreover, this is intended use).

Claims 9, 21 and 30: "The first carrier gas and the second carrier gas are nitrogen."
(Moreover, this is intended use).

Claim 10, 22, and 31: Applicant's *claims requiring a specific gas identity in the pending apparatus claims* are claim requirements of intended use of the *pending* apparatus claim. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQ2d 1647 (1987).

'371 further teaches the main controller #72 controls the partial pressure of treating liquid through adjusting flow control valve #39 (col. 9, lines 9-13), which requires a partial pressure sensor. '371 further teaches the partial pressure of the vapor of treating liquid may be adjusted by the treating liquid supply (col. 14, lines 58-65), in addition to the adjustment of diluting gas (using valve #41).

'371 does not explicitly teach the other limitations of:

Claim 1: A first valve adapted to regulate the first carrier gas, a gas analyzer having an ultrasonic transducer or a mass flow meter adapted to generate a signal indicative of a concentration of the precursor in the process gas; and a controller configured to calculate a mass flow rate of the precursor based on the signal.

Claim 11: A precursor monitoring apparatus disposed between the process chamber and the vessel, wherein the precursor monitoring apparatus has a gas analyzer to generate a signal indicative of a concentration of the precursor in the process gas or the signal is indicative of the flow rate of the precursor; and an integral controller to receive the signal.

Claim 23: A first valve to regulate a first carrier gas, a gas analyzer to generate a signal indicative of a concentration of the precursor in the process gas or indicative of a process flow

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rate; and a controller to receive the signal and is configured to maintain the concentration of the precursor and the volume flow rate of the process gas constant by adjusting the first valve and the second valve.

Claim 13: A first valve controls the first carrier gas.

Claims 3 and 5: The controller is configured to adjust both the first valve and the second valve while maintaining the process gas with a constant flow.

Claims 14 and 16: The integral controller is configured to adjust both the first valve and the second valve while maintaining the process gas with a constant flow.

Claim 6: The first valve is adjustable to increase or decrease the concentration of the precursor in the process gas.

Claim 26: The first valve adjusts to increase or decrease the concentration of the precursor in the process gas.

Claim 17: The first valve is adjusted to increase or decrease the concentration of the precursor in the process gas.

Claim 20: The gas analyzer is selected from the group consisting of ultrasonic transducers, infrared spectroscopy, ultraviolet spectroscopy, gas chromatography, mass spectroscopy, mass flow meters and combinations thereof.

Claim 29: a gas analyzer is selected from the group consisting of ultrasonic transducers, infrared spectroscopy, ultraviolet spectroscopy, gas chromatography, mass spectroscopy, mass flow meter, and combinations thereof.

'325 is an analogous art in the field of liquid vaporizer (abstract), particularly in providing a stable flow rate of raw material (col. 1, lines 65-67), similar to the problem '371 is solving for a stable atmosphere without re-condensation (col. 2, lines 13-19). '325 provides a valve (#45; Fig. 4) for the carrier gas to the liquid source (#53). '325 further provides a gas analyzer (thermal conductivity sensor #46; mass flow meter #44 and controller #37, together, makes a gas analyzer; Figure 4, col. 4, lines 14-29) having a mass flow meter (#44). The gas analyzer (#46+#44+#47; Figure 4) adapted to generate a signal indicative of the concentration of the precursor (col. 4; lines 14-25).

At the time the invention was made, it would have been obvious to a person having ordinary skill in the art to have added Gomi's gas analyzer (#44+#47+#46; Fig. 4) to the apparatus in Fig. 2 of '371.

Motivation have added Gomi's gas analyzer (#44+#47+#46; Fig. 4) to the apparatus of '371 is to adjust the treating liquid (in addition to the adjustment of the diluting gas) to a specific liquid vapor partial pressure profile, as taught by '371 (col. 14, lines 58-65), with a reasonable expectation of success. This combination would have the capability of providing constant flow rate of process gas at specific concentration or partially pressure profile.

4. Claims 2, 12, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over '371 and '325, further in view of Renken et al. (US 4685331, hereafter '331).

'371 and '325, together, teach all limitations of claims 1, 11, and 23. '371 further teaches the system is pulsed (col. 10, lines 11-15).

'371 and '325, together, do not teach the limitation of:

Claim 2: The controller is configured to adjust both the first valve and the second valve (41; Figure 1; column 8, line 34) while the precursor is pulsed into the process chamber at a time period within a range from about 0.01 seconds to about 5 seconds.

Claim 12: The integral controller is configured to adjust both the process gas to be pulsed into the process chamber at a time period within a range from about 0.01 seconds to about 5 seconds.

Claim 24: The precursor is pulsed into the process chamber at a time period within a range from about 0.01 seconds to about 5 seconds.

'331 is an analogous art in the field of mass flow meter for liquid or gas (field of the invention), particularly in highly accurate flow measurement (col. 2, lines 12-15), which meets the need of '371 for adjusting partial pressure of the vapor of treating liquid (abstract, last sentence). '331 provides a sensor/valve assembly with response time less than 0.06 seconds (Fig. 1, col. 3, lines 20-23).

At the time the invention was made, it would have been obvious to a person having ordinary skill in the art to have adopted the sensor/valve assembly as taught in '331 to the apparatus of Fig. 2 of '371.

Motivation would have been to accurately adjust the treating liquid and the adjustment of the diluting gas to a specific liquid vapor partial pressure profile, as taught by '371 (Fig. 3, col. 9, lines 8-23 and col. 14, lines 58-65), with a reasonable expectation of success. The above combination would have the capability of pulsing from 0.06 seconds rate and up.

Response to Arguments

1. Applicant's arguments, see page 9, filed December 27, 2007, with respect to Ono have been fully considered and are persuasive. The rejections based on Ono of all claims has been withdrawn.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Keath T. Chen whose telephone number is 571-270-1870. The examiner can normally be reached on M-F, 8:30-5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on 571-272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. T. C./
Examiner, Art Unit 1792
/Rudy Zervigon/
Primary Examiner, Art Unit 1792